



SeaPac Hatchery Flow Measurement Summary

Presented by Mathew Weaver

September 21, 2010









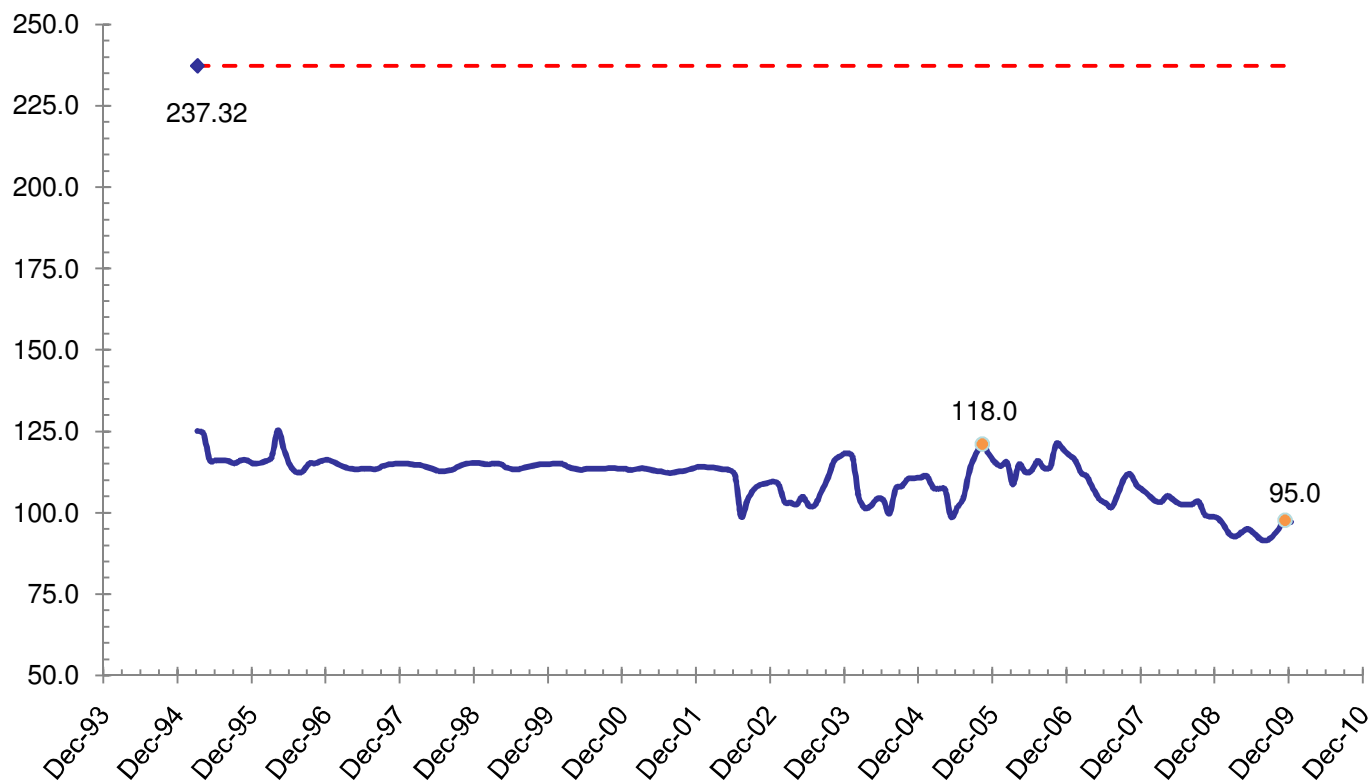


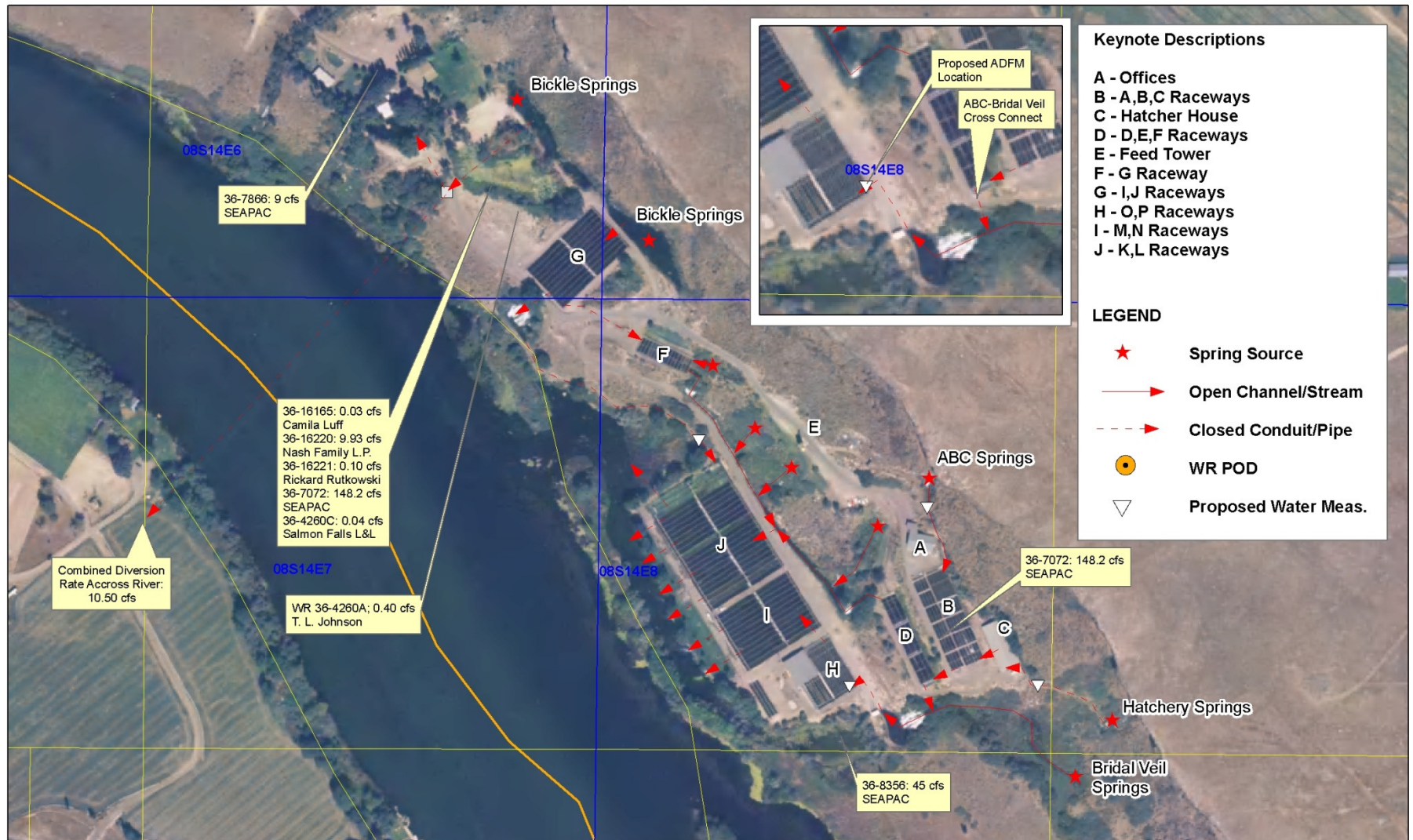
SEAPAC Family of Water Rights

<u>Basin</u>	<u>Sequence</u>	<u>Suffix</u>	<u>Basis</u>	<u>Status</u>	<u>Right ID</u>	<u>Priority Date</u>	<u>Rate(cfs)</u>	<u>Volume(af)</u>	<u>Source</u>	<u>Water Use(s)</u>
47	7092		License	Active	603664	3/2/1970	33.00	23849.0	UNNAMED STREAM	FISH PROPAGATION
47	7115	F	License	Active	605857	4/8/1971	0.14		GROUND WATER	FISH PROPAGATION, IRRIGATION
47	7205		License	Active	605803	5/10/1973	0.70	3.5	GROUND WATER	FISH PROPAGATION, IRRIGATION
47	7580		License	Active	605808	10/5/1979	0.20	81.7	GROUND WATER	COMMERCIAL, HEATING, RECREATION
47	7663	K	License	Active	603651	8/21/1980	0.40	70.0	GROUND WATER	COMMERCIAL
47	7826		License	Active	605813	6/8/1982	0.20		GROUND WATER	FISH PROPAGATION
36	7072		Decreed	Active	356940	9/5/1969	148.20		THOUSAND SPRINGS	FISH PROPAGATION
36	7866		Decreed	Active	324812	7/11/1979	9.00	6515.8	SPRINGS	DOMESTIC, POWER
36	8356		License	Active	557263	5/9/1988	45.00	32600.0	SPRINGS	FISH PROPAGATION
47	7663	K	License	Active	97265	8/21/1980	0.40	70.0	GROUND WATER	COMMERCIAL
47	13957		Decreed	Active	110867	3/2/1970	0.04	2.8	GROUND WATER	COMMERCIAL
47	17148			Active	580103	7/12/2004	0.04		GROUND WATER	DOMESTIC

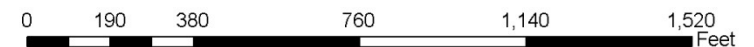
**Total Flow Rate on
Paper: 237.32 CFS**

Magic Springs Hatchery (SeaPac) Self Reported Monthly Average Flow Data (CFS)





SEAPAC HATCHERY AND WATER USE SITE MAP



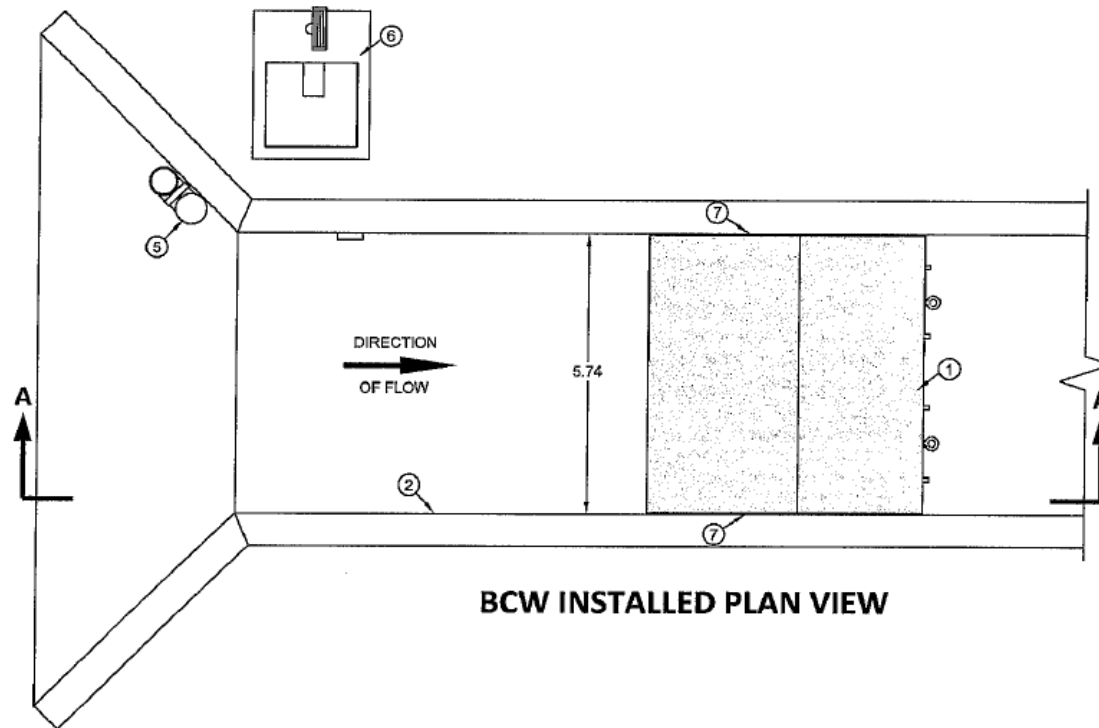
ABC Springs

Broad Crested Weir, Pressure Transducer, & Data Logger

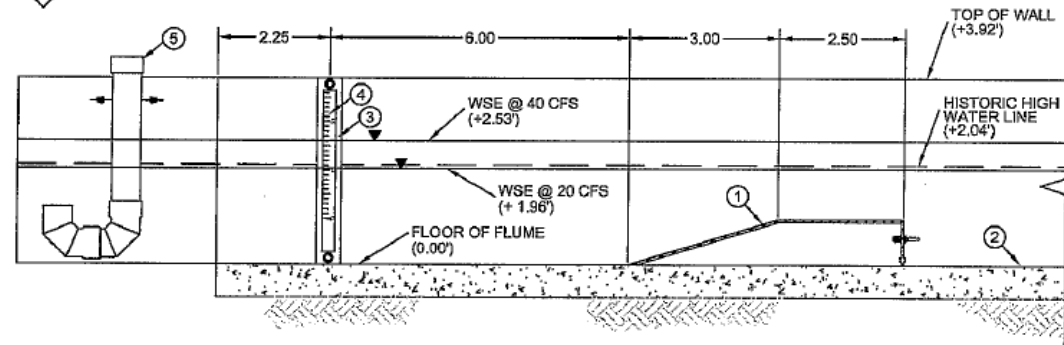


KEYNOTES

- ① METAL BROAD CRESTED WEIR, RE: SHEET 2/3.
- ② EXISTING ~5.73' WIDE X ~3.83' DEEP (INSIDE DIM.) RECTANGULAR CONCRETE FLUME/CHANNEL.
- ③ 2x6 PLASTIC BOARD MATERIAL (TREX OR SIM.) BOLTED TO FACE OF STRUCTURE W/ $\frac{1}{2}$ " STAINLESS STEEL ANCHOR BOLTS.
- ④ FIBERGLASS REINFORCED POLYESTER LAMINATE STAFF GAGE (PLASTI-FAB OR SIM.) ANCHORED TO 2X6 BOARD W/ STAINLESS STEEL SCREWS. SET DATUM MARK "0" FLUSH WITH SILL HEIGHT.
- ⑤ 6" O.D. PVC PIPE STILLING WELL WITH CAP AND TWO EL FITTINGS. ATTACH STILLING WELL TO SIDE OF EXISTING CONCRETE WALL PER "STILLING WELL MOUNTING DETAIL", RE: SHEET 2/3.
- ⑥ 28"X36"X4" REINFORCED CONCRETE PAD, STEEL ENCLOSURE, AND SOLAR PANEL ASSEMBLY, RE: SHEET 3/3.
- ⑦ FILL GAP BETWEEN WEIR AND SIDE OF CONCRETE WALL W/ PREBLENDED, PREPACKAGED, MASTIC, QUICK-SETTING, NON-SHRINKING CEMENT-BASED MORTAR SUITABLE FOR HAND PLACEMENT, SIM. TO THORO WATERPLUG.



BCW INSTALLED PLAN VIEW



BCW INSTALLED SECTION VIEW (A-A)

1

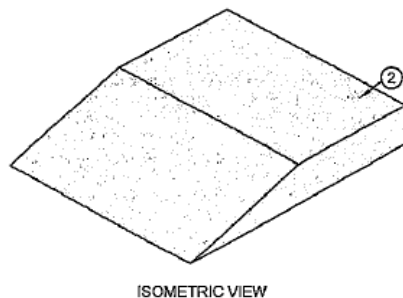
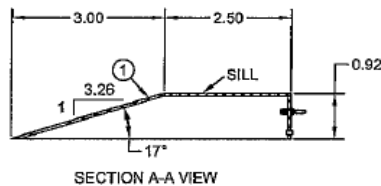
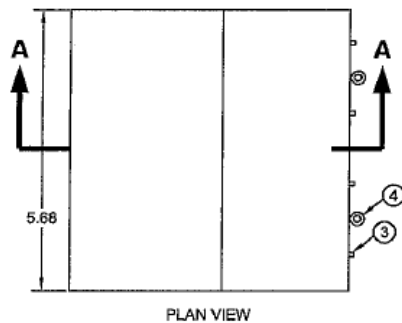
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DATE: 3/11/09

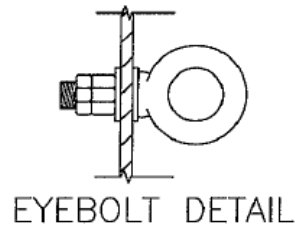
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MDW

SEAPAC ABC SP. BROAD
CRESTED WEIR (BCW)

SCALE: NTS

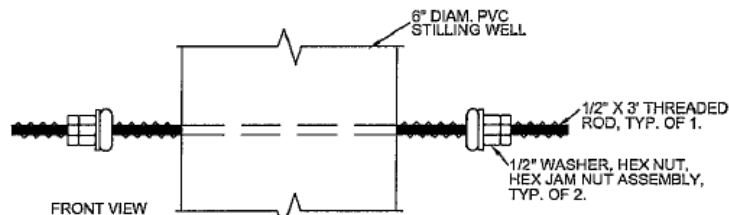
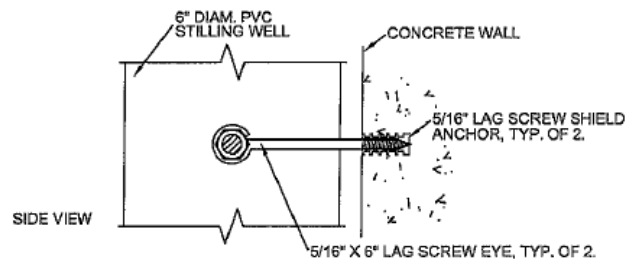


BCW MANUFACTURING DETAILS



KEYNOTES

- ① STEEL BROAD CRESTED WEIR. MINIMUM 3/8" STEEL PLATE SHALL BE USED FOR ALL COMPONENTS OF WEIR. PREFABRICATION RECOMMENDED WITH DELIVERY TO SITE FOR INSTALLATION.
- ② BCW SHALL BE TREATED FOR WATER AND GENERAL CORROSION RESISTANCE WITH A COAL TAR EPOXY PAINT.
- ③ 1" DIAMETER WEEP HOLE, TYPICAL OF 4.
- ④ 3/4" X 2-1/2" STAINLESS STEEL GALVANIZED SHOULDER STYLE EYEBOLT, WITH A MIN. 2,500 POUND WORKING LOAD LIMIT, OR SIMILAR; TYPICAL OF TWO. ATTACH EYEBOLTS TO STEEL PLATE WITH TWO WASHERS, A HEX NUT, AND HEX JAM NUT ASSEMBLY, REFER TO THE EYEBOLT DETAIL. WELDED EYE ASSEMBLIES MAY BE SUBSTITUTED IF THEY MEET THE ABOVE WORKING LOAD LIMIT.



STILLING WELL MOUNTING DETAIL

2

3

DATE: 3/11/09

DRAFTED BY:
MDW

**SEAPAC ABC SP. BROAD
CRESTED WEIR (BCW)**

SCALE: NTS

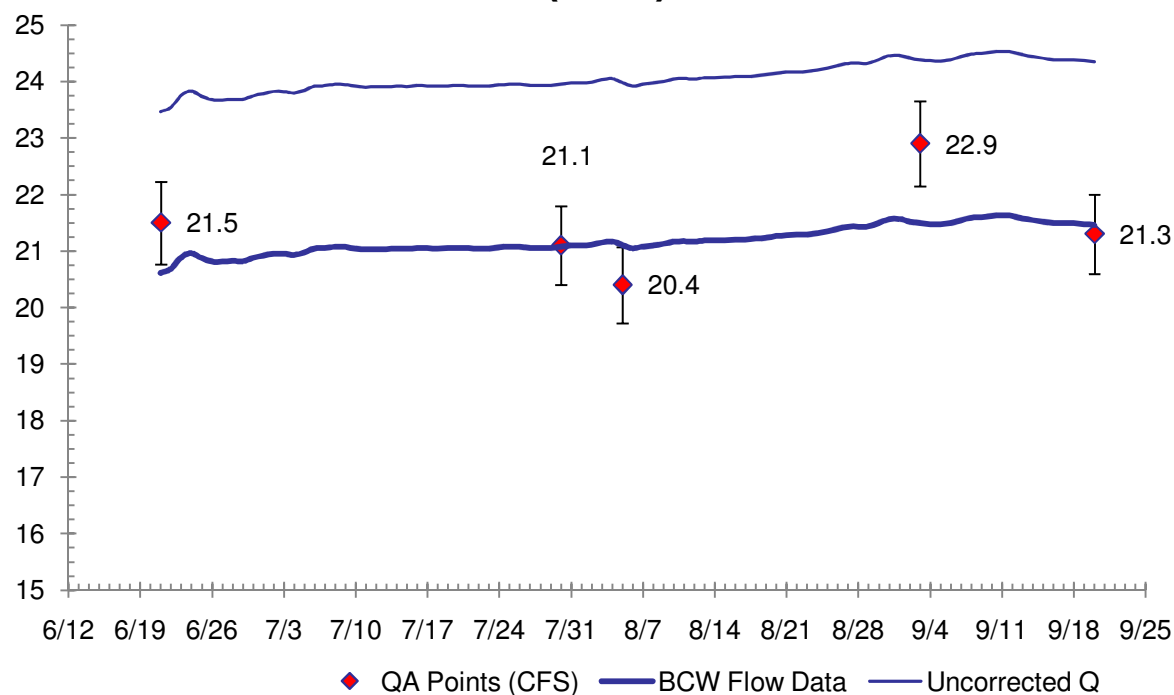
ABC Springs

Broad Crested Weir, Pressure Transducer, & Data Logger



Measurement Data and QA/QC

ABC Springs Average Daily Flow Rate Data (CFS)



Notes:

Weir Data Corrected for Channel Approach Slope/12' Gage Offset (0.09 feet).

Error bars on QA points represent reported uncertainty from current meter (average 3.3%).

Date	FlowTrk. Q (CFS)	BCW Q (CFS)	% Disc.
6/21/10	21.5	20.6	4.1%
7/30/10	21.1	21.1	0.1%
8/5/10	20.4	21.1	-3.5%
9/3/10	22.9	21.5	6.1%
9/20/10	21.3	21.5	-0.8%

Bridal Veil Springs

Doppler Flow Meter, Pressure Transducer, & Data Logger



Bridal Veil Springs

Doppler Flow Meter, Pressure Transducer, & Data Logger

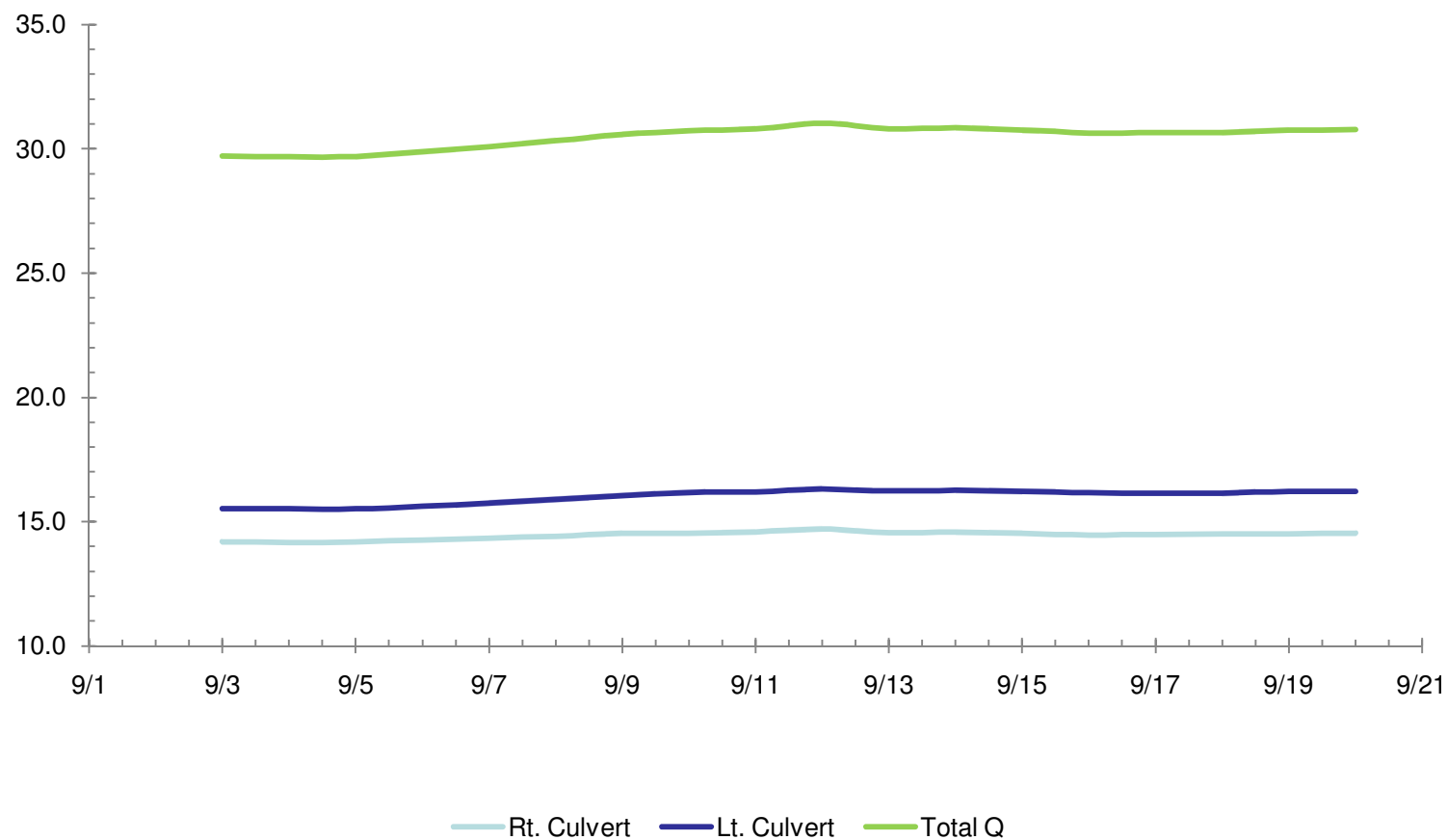


Bridal Veil Springs

Doppler Flow Meter, Pressure Transducer, & Data Logger

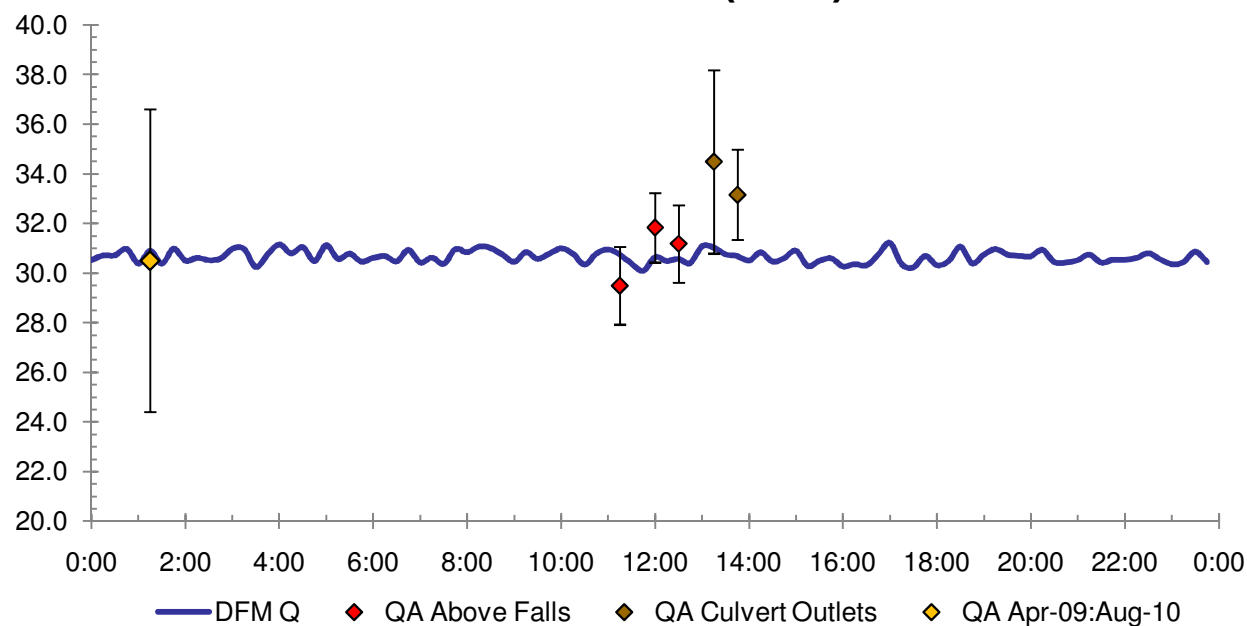


Bridal Veil Sprngs Avg. Daily Flow Rate (CFS)



Measurement Data and QA/QC

Bridal Veil Flow Rates (CFS) - 9/17/10



Notes:

Error bars for "Above Falls" and "Culvert Outlets" represent reported uncertainty from current meter.
Error bars for "Apr-09:Aug-10" represent standard deviation amongst all measurement types and

9/17/2010 Time	FlowTrk. Q (CFS)	DFM Q (CFS)	% Discrepancy
11:15 AM	29.5	30.7	-4.2%
12:00 PM	31.8	30.6	3.7%
12:30 PM	31.2	30.6	2.0%

In Closing

- Measurement Uncertainty Better than 10% (~4-6%)
- Currently Measuring ~55% of Total Spring Complex Flows $((21.5+30.8)/95)$
- Bickle Springs